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Introduction to the special issue 'The phenomenology of joint action'

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Abstract

The contributions collected in this special issue explore the phenomenology of joint action from a broad range of different disciplinary and methodological angles, including philosophical investigation (both in the analytic and the phenomenological tradition), computational modeling, experimental study, game theory, and developmental psychology. They also vastly expand the range of discussed cases beyond the standard examples of house-painting and sauce-cooking, addressing, for example, collective musical improvisations, dancing, work at the Diversity and Equity office of a university, and historical examples of collective violence such as the revolutionary Terror in France and the Nazis. In our introduction to this special issue, we group the contributions into three thematic areas – 1) the phenomenological fine-structure of joint action, 2) underlying mechanisms for joint action and 3) phenomenal preconditions for joint action. The first theme is discussed under a number of issues – a) components of the phenomenology of joint action, b) the I and the we in joint action, c) the effect of group size, structure and nature on the phenomenology of joint action and d) how do phenomenal relate to normative aspects of joint action?

Keywords Phenomenology of Joint Action · Joint action · Sense of Agency · We-Agency

Contemporary multidisciplinary work on cognition increasingly approaches the subjects of social cognition as agents who live and act in complex social environments. This attitude extends to all levels of social cognition—starting with, for example,

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developmental psychological studies on how we come to acquire basic mindreading skills and extending to how complex cultural cognition is achieved. At the core of this understanding of social cognition as agentive participation lies the notion of *joint action*. Joint action may be broadly described as two or more agents intentionally coordinating to perform a task. Typical cases of joint action described in the literature are doing some physical action together, for example, lifting a heavy sofa together, walking together, or painting a house together. But most theorists acknowledge also the existence of much more complex joint actions, like a symphony orchestra's playing a piece of music (Kutz, 2000; Pacherie, 2012). There is also emerging interest in understanding the nature of modern technologies such as digital media within a framework for joint action (e.g. Gangopadhyay and Pichler, 2021). Research in joint action has witnessed intense, interdisciplinary debates on various aspects of joint action. Philosophers have proposed various analyses of the structure of joint action (e.g. Bratman, 1992, 1993, 1999; Searle, 1990, Tuomela, 2006), as well as of the nature of the mental states involved in it (e.g. Searle, 1990, Tuomela, 2006). Psychologists have studied the perceptual and cognitive processes involved in joint action, and developed hypotheses about how abilities for joint action develop in childhood (e.g. Trevarthen, 1980, Rochat, 2001, Reddy, 2008, Carpenter, 2009, Meyer et al., 2016). There is also growing research in neuroscience to uncover the neural mechanisms that enable fundamental joint action capacities, for example – basic motor cooperation and prediction, and the relationship of such capacities to brain areas thought to be involved in mentalizing or knowing other people's mental states (e.g. Sebanz & Knoblich, 2009; Chaminade et al., 2012).

Amid this burgeoning multidisciplinary research, an area of investigation that has been emerging only in the last few years is the *phenomenology* of joint action. How do we consciously experience joint action? What cognitive mechanisms underlie our experience of joint action? What is the role of this experience in agency? In the case of individual action, analogous questions have been the subject of much interest in interdisciplinary research over the last decades—especially with regard to the "sense of agency", the experience of being the author of an action (e.g. Gallagher, 2000, 2012; Frith et al., 2000; de Vignemont and Fourneret, 2004; Bayne, 2008; Pacherie, 2008; Balconi, 2010; Moore and Fletcher, 2012; Haggard and Eitam, 2015; Braun et al., 2018). Inspired by such research, some researchers have, over the last years, moved on to conceptual discussions and empirical studies of the "sense of joint agency" (an experience of *us* being the author of an action), mechanisms that subserve and factors that modulate the sense of joint agency, as well as further aspects of the phenomenology of joint action (e.g. Seemann, 2009; Dokic, 2010; Obhi and Hall, 2011; Pacherie, 2012, 2014; Tollefsen, 2014; Dewey et al., 2014; Bolt et al., 2016, 2017; Capozzi et al., 2016; Chennells and Michael, 2018; Richardson 2018; Sahaï et al., 2019; Fernández-Castro and Pacherie, 2022; Le Bars et al., 2020, 2022).

It is the aim of this special issue to promote this emerging interest in the phenomenology of joint action. The contributions collected in this special issue explore the phenomenology of joint action from a broad range of different disciplinary and methodological angles, including philosophical investigation (both in the analytic and the phenomenological tradition), computational modeling, experimental study, game theory, and developmental psychology. They also vastly expand the range of discussed cases beyond the standard examples of house-painting and sauce-cooking, addressing, for example, collective musical improvisations, dancing, work at the Diversity and Equity office of a university, and historical examples of collective violence such as the revolutionary Terror in France and the Nazis.

In our introduction to this special issue, we group the contributions into three thematic areas – 1) the phenomenological fine-structure of joint action, 2) underlying mechanisms for joint action and 3) phenomenal preconditions for joint action. The first theme is discussed under a number of issues – (a) components of the phenomenology of joint action, (b) the I and the we in joint action, (c) the effect of group size, structure and nature on the phenomenology of joint action and (d) how do phenomenal relate to normative aspects of joint action? We summarize some of the main claims made in the contributions, locate them with respect to the existing literature and formulate questions for further research.

1 The phenomenological fine-structure of joint action

1.1 Components of the phenomenology of joint action

A basic issue in the study of the phenomenology of joint action concerns the question of what different components can be distinguished in our experience of joint actions. Pacherie (2014) has proposed to distinguish between two dimensions: one that is "outcome-related"—to what extent do I as participant in a joint action experience the outcome of that action to be produced by myself/us, rather than by someone/something else—and one that is "agent-related"—do I experience the joint outcome as being brought about by myself as individual agent ("self-agency"), or by the group as a whole ("we-agency") (Pacherie, 2014, 26)? Tollefsen (2014) adds that the phenomenology of joint action also often includes a "sense of joint control", while Salmela & Nagatsu (2017) point to a dynamic affective dimension consisting of shared emotions.

While several of the articles in this special issue address different components of the phenomenology of joint action in the course of their arguments (e.g. Chennells & Michael: sense of commitment; Forlè: vitality features; Baker & Ebling: sense of ownership, felt (mis)match between action and values), the contribution by Pierre Saint-Germier, Louise Goupil, Gaëlle Rouvier, Diemo Schwarz and Clément Canonne focuses directly on the issue of how to decompose the phenomenology of joint action into various elements. In "What it is like to improvise together? Investigating the phenomenology of joint action through improvised musical performance", the authors use an experimental approach to explore the phenomenological fine-structure of joint action, studying the performances in musical collective free improvisation of two expert ensembles of different size. Through questionnaires that musicians answered sequence-wise while watching and listening to an audio-video-recording of their performance, the authors assess five phenomenological variables: (i) musicians' feeling that they are able to influence the music of the group ("Sense of agency [that musicians felt towards their joint outcome]"); (ii) their feeling of being immersed within the group ("We-agentive identity")—these first two variables are meant to capture Pacherie's "outcome-related" and "agent-related" dimensions; (iii) the feeling that the participants' actions are well integrated with each other ("Integration"); (iv) the musician's feeling that their actions depend on the actions of the others ("Dependence"); and (v) the extent to which the musician engages in conscious reflection during the performance ("Reflexivity"). Besides, the authors captured also the musicians' intentions as the performance was unfolding (change vs. support the current direction of the music), as well as three measures of interaction in the actual performance (leadership, alignment and interdependence). Among much else, the authors found that "Sense of agency" and "We-agentive identity" were not correlated, while "We-agentive identity" and "Integration" were correlated, but could occur also in isolation. This provides empirical support for Pacherie's hypothesis that the outcome-related ("Sense of agency") and the agent-related ("We-agentive identity") dimensions of the phenomenology of joint action are distinct from each other. Besides, it is particularly interesting that the study establishes "Integration", "Dependence" and "Reflexivity" as new phenomenological variables. They plausibly contribute to the phenomenology of many other forms of joint action, too, and should be explored in further research also beyond the case of musical improvisation. We shall return to further findings in Saint-Germier et al.'s study shortly.

1.2 The I and the we in joint action

Given that current discussions revolve round a distinction between a sense of "self-agency" (an experience of the joint outcome as being brought about by myself as an individual agent) on the one hand and a sense of "we-agency" (an experience of the joint outcome as being brought about by the group as a whole) on the other, a next central question is: how do these two aspects relate to each other? Much of the discussion in this context attempts to address the issue of what happens to the sense of self-agency when an agent enters into a joint action. Is joint agency experienced at the cost of an individual's sense of self-agency? Or is it experienced as a shared "we-agency" with perhaps modified aspects of self-agency?

Contributions in this special issue address the above questions by building on claims presented in Pacherie (2012, 2014) and Salmela & Nagatsu (2017). Pacherie and Salmela & Nagatsu claim that the experience of joint action can sometimes take over the sense of self-agency: especially when participants perform very similar sub-actions with similar outcomes in synchronic timing—Pacherie's example are marching soldiers, Salmela & Nagatsu's participants in a ritual. In these cases the experiential boundary between individual and the group gets blurred, agents feel absorbed in the collective and no longer experience themselves as individual agents making their own specific contributions to the joint action (Pacherie, 2012, 376, cf. Pacherie, 2014, 37 f.; Salmela & Nagatsu 2017, 462). The whole experience becomes one of "boundary loss" (McNeill, 1995) and of "feeling they are one" (McNeill, 1995, 8). But in other cases, according to all three[1] authors, the experience of joint action leaves the sense of self-agency intact—agents experience themselves as making, qua distinct individuals, contributions to a joint action to which other agents, too, are contributing (Pacherie, 2012, 376; Salmela & Nagatsu, 2017, 455). According to Pacherie (2012, 376; 2014, 38), the latter is typically the case when the joint action requires participants to perform different, complementary sub-actions. Pacherie (2012, 376) uses the term "experiences of shared agency" for this latter scenario, while she reserves the term "experiences of we-agency" for cases where the experience of joint action reduces or eliminates the sense of self-agency. Salmela & Nagatsu (2017), by contrast, conceptualize both kinds of cases as instances of the "sense of we-agency", understood as experience that "derives from agentively contributing to a shared goal together with others in a cooperative manner", and "is enacted by sharing a goal and contributing to it jointly with others, and enhanced by successfully achieving it" (Salmela & Nagatsu 2017, 454).

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[1] Pace Salmela & Nagatsu (2017): they seem to misrepresent Pacherie's account in this regard by leaving her "experiences of shared agency" out of the picture.

Francesca Forlè's article "The sense of we-agency and vitality attunement: between rhythmic alignment and emotional attunement" presents an account of the phenomenology of joint action that combines Salmela & Nagatsu's account of the "sense of we-agency" with the requirements for genuine we-experiences that are identified by León, Szanto and Zahavi (León, 2020; León et al., 2019; Zahavi, 2015). Focusing on emotional sharing, these latter authors argue that we-experiences require mutual awareness of each other's experiences, I-you-relationships and a "sense of togetherness" in virtue of which the subject feels part of a "we" but without thereby losing its awareness of itself as a distinct individual. By applying this account to the case of joint action, Forlè develops a view that differs in an interesting regard from Pacherie's: even experiences of joint action that come with a high degree of immersion into a group do not blur, but rather presuppose, the self-other-distinction. In this view, immersion is understood in terms of a strong sense of mutual interdependence. Forlè suggests that this sense of we-agency can be boosted by a factor that has hitherto been neglected: "vitality attunement". Forlè builds here on the work of Daniel Stern, whose category of "forms of vitality" refers to formal aspects that can confer a sense of being alive to various phenomena (movements, facial expressions, melodies, lines etc.): as examples, she cites the qualities of "being forceful, rushing, tense, gentle, fading, weak, disappearing, surging". Vitality attunement obtains, according to Forlè, when "two or more individuals are aligned in the forms of vitality of their behavior". As examples, she discusses vitality attunement between dancers (e.g., tango dancers who both use "passionate and forceful" movements) and between musicians in an orchestra.

Saint-Germier and colleagues' study on collective improvisation tackles the contrast between self- and we-agency in virtue of its variable "We-agentive identity". At least in the smaller of the two ensembles that the authors study, there were some sequences that received high scores on both "Sense of agency" (which is defined by the authors in terms of the individual agent's sense of *his/her* influence over the outcome) and "We-agentive identity" (cf. Saint-Germier et al., this volume, Figure 3)—a finding that is consistent with Pacherie's (2014, 38) and Salmela & Nagatsu's (2017, 455) suggestion that immersive experiences of we-agency can coexist with an intact sense of self-agency. The authors found also that when musicians aligned their performances, this tended to increase a sense of immersion in the group, possibly because they were then less able to distinguish their contributions from those of their partners (Saint-Germier et al., this volume, section 4.3). This is again in line with Pacherie's description of “experiences of we-agency” as boundary-blurring. Yet at the same time, the authors also found that “We-agentive identity” (corresponding to Forlè’s “sense of we-agency”) positively correlated with “Integration” and “Dependence” (Saint-Germier et al., this volume, section 4.1), too. The latter are a matter of mutual responsiveness and systematic covariation, not necessarily of similarity between the sub-actions of players (alignment). This aspect of “We-agentive identity” may be better captured by Forlè’s account, construing the relation between the I and the we in joint agency as one of strong mutual interdependence which achieves the purpose of deeply engaging and immersing an agent in a joint action, but requires a presupposition of the self-other distinction. One may also argue that vitality attunement could be considered as a factor contributing to “Integration” and “Dependence” as described by Saint-Germier and colleagues. According to Forlè, even if there are experiences of boundary-less ‘one-ness’ in some cases of joint actions, there is no need to consider these cases as paradigmatic cases of joint action (Forlè, this volume, section 2).

Further conceptual and empirical work could address this emerging contrast between different views of the phenomenology of group-immersion, especially in the context of complex joint actions. Moreover, the link that Forlè establishes between the “sense of we-agency” and the notion of a “we-experience” merits further debate. Does the “sense of we-agency” always require mutual awareness of co-agents’ undergoing the same agentive experience (as Forlè’s analogy with emotional sharing seems to imply), and I-you-relationships? Or can it exist also in conditions where agents lack information about each others’ agentive experiences, and/or stand in more third-personal-relationships to each other?

Besides, it is particularly interesting to note that both Forlè and Saint-Germier et al. share a focus on aesthetic performances—musical improvisations, dances, orchestra performances, yet interpret the phenomenology of deeply immersive aesthetic contexts differently with respect to the sense of self-agency. This, too, is an aspect of the phenomenology of joint action that should be further explored in future research: how do action-related phenomenal qualities that are experienced by performers relate to the aesthetic properties of such performances, and to the way audiences experience the performances?

1.3 The effect of group size, structure and nature on the phenomenology of joint action

However one chooses to characterize the phenomenology of joint action, a cornerstone in the debate is the composition of the collective that performs the action. Following Pacherie (2012, 2014), it seems very plausible to hypothesize that both group size, group structure (e.g. hierarchical vs. egalitarian) and the kind of division of labour in the group make important differences concerning how we experience joint actions. In particular, according to Pacherie’s account of the mechanisms underlying our experience of joint actions (cf. Section 2 below), a crucial factor in experiencing joint agency is how well one can predict one’s own and the other’s actions. This implies that the sense of agency for joint actions is, other things being equal, stronger in small-scale, egalitarian actions than in large, hierarchical actions. Moreover, in a large, hierarchical group agents higher up the hierarchy are more likely to have a stronger sense of agency for the joint action than those down in the hierarchy because the former are better able to control and predict the others' actions as well as the joint outcome. Does this imply that what is experienced as joint action by one agent in a group may not be experienced as joint action by other participants? What are the normative implications of such differential experience of joint agency or experience of joint agency for some participants but not for other participants? We will return to this discussion shortly.

Besides, Pacherie contends that both what she calls "sense of we-agency" (where the experience of 'us' performing the action suppresses the sense of self-agency) and what she calls "sense of shared-agency" (where the experience of 'us' performing the action coexists with the sense of self-agency), may be experienced in group scenarios depending on whether one aligns one's actions with others, e.g. in a military drill, or one is performing different but complementary actions, e.g. in a music ensemble. Do these hypotheses withstand empirical scrutiny? Moreover, the larger the number of participants the greater is the possibility that the nature and phenomenology of the interaction seeps out from the confines of a tidy joint action scenario to interactions that may not be straightforwardly put in the category of joint action, for example because the group members may not participate in a shared intention. What happens to the phenomenology of action once one considers the collective agency of groups such as universities or companies?

In this special issue, the contributions by Saint-Germier et al. and Baker & Ebling focus especially on how the phenomenology of joint actions is affected by the size, structure and nature of the acting group. In their study of two improvisation ensembles of different sizes, Saint-Germier and colleagues found support for the hypothesis also presented by Pacherie (2014) that larger group size tends to decrease predictability, and hence to weaken the sense of agency for the joint action: musicians in the larger group reported on average lower "Sense of agency". By contrast, members of the larger ensemble were more likely to report high scores on "We-agentive identity", but the authors argue that this is consistent with Pacherie's view about the conditions of we-agency: individual contributions are harder to discriminate in the larger ensemble, both because of the sheer number of musicians and because of the predominant style in the larger ensemble ("slowly evolving collective textures" that facilitate interaction). However, recordings of the ensemble studied by the authors (Orchestre des Nouvelles Créations, Expérimentations et Improvisations Musicales, ONCEIM) show that this form of lack of discrimination is quite different from the cases Pacherie conceptualizes as "we-agency", such as the marching soldiers: Pacherie describes scenarios in which individuals do (almost) the same things, in synchrony; members of ONCEIM, by contrast, add various different, often freely timed nuances and details to the emerging soundscape. Further philosophical and empirical research could address the issue of how to account for the phenomenal contrast between such different forms of group-immersions.

Jordan Baker and Michael Ebling add an ontological angle to the question of how group constitution affects phenomenology. In their contribution "Group Agents and the Phenomenology of Joint Action", they build on an important distinction that has emerged from debates in social ontology, namely between *joint action* as phenomenon where various agents together carry out a *shared intention*, and *group agency* as phenomenon where a "group mind" or "group agent" emerges—a functional entity (e.g., an institution or corporation; Pettit and Schweikard, 2006) with its own attitudes which supervene on, but may differ from, the attitudes of the participants. Based on vignettes that draw on real-life cases, the authors argue that joint actions (where people act together, without thereby giving rise to a group mind) tend to support a sense of agency, which they analyze (following Gallagher, 2000, 2012) into two dimensions: a "sense of authorship" (the "feeling of being the source of one's actions") and a "sense of ownership" (the sense that I am experiencing the action—that it is my body that is moving/my mind that is thinking). Moreover, at least when they are successful, joint actions are typically experienced as enhancing individual agency, and are therefore especially fulfilling. By contrast, group actions (where a group mind emerges from the interaction of different individuals) tend to create experiences of alienation, where the agents feel "disconnected" from their activity: sense of ownership is lacking here, and the individual's values do not match or connect with the actions she is carrying out as part of the group action. Importantly, Baker and Ebling qualify this contrast by pointing out that concrete cases form a continuous spectrum, and that they are highlighting paradigmatic cases that are compatible with the existence of alienated joint actions and non-alienated group actions. They also make proposals as to how group action can be organized so that alienation gets diminished.

How is it that joint actions and group actions may be phenomenally different? Baker and Ebling tackle this question by building on two different theoretical resources. The first is Talbot Brewer's (2009) distinction between two models of agency, an "Aristotelian" one and a "Humean" one. In Aristotelian agency, the value of an activity is often not fully understood at the outset; one needs to engage in the activity in order to gradually understand the value. Such activity and understanding involve "apprehensions of value", mental states that can motivate actions even without providing full propositional specifications of expected outcomes. By contrast, Humean agency is guided by fully specified representations of desired states. Besides, Baker and Ebling propose a view of group minds that combines Philip Pettit's account of group minds (e.g. Pettit, 2003) as functional entities with collective attitudes that result from aggregation functions, with a version of Jessica Wilson's (2015) account of weak emergence. On this basis, Baker and Ebling argue that group actions tend to be affected by alienation for at least two reasons. First, the proper agent of the group action is not the individual agents, but the emerging group agent (e.g., the University adopts such-and-such policy). This undermines the sense of ownership of individual agents over the resulting action. Second, aggregation functions yield binary attitudes towards fully specified propositions. Hence, group action is Humean, and does not support processes in which agents gradually come to understand the value of the activity they engage in—resulting in disconnection between the value apprehensions of individuals, and the things they do as participants in the group action. By contrast, joint action is consistent with sense of ownership, and it is Aristotelian and hence supports "dialectical activities" in which partners together explore and come to understand the value of their joint activities.

Baker and Ebling's paper not only invites us to pay more attention to possible phenomenal differences between joint and group actions, it also introduces several further candidates for components of the phenomenology of joint (and group) actions, namely the sense of ownership, alienation (both in terms of lacking ownership and of mismatch between one's values and actions), and shared dynamic apprehensions of values. These elements deserve further theoretical debate, but also empirical study. In particular, future research could empirically test Baker and Ebling's hypothesis that group action tends to promote alienation while joint action doesn't, and assess to what extent alienation may also be favoured by other factors such as group size, hierarchical organization and motivational factors.

1.4 How does the phenomenal relate to the normative in joint actions?

Several phenomenal aspects of joint (and, in the case of Baker & Ebling, group) action that we have discussed so far raise questions concerning issues of normativity and responsibility (including collective responsibility for joint actions, cf. Miller, 2001; Isaacs, 2011; Giubilini and Levy, 2018). If participants undergo experiences of alienation, lack a sense of ownership and experience a mismatch between a group action and the individual's values as described by Baker and Ebling—or, for that matter, if they engage in "we-agency" in Pacherie's sense and lose the experiential self-other boundary, or if they are lower-ranking individuals in a hierarchical group structure who have difficulties predicting joint outcomes and hence are limited in their sense of agency for the joint action—what are the normative implications of these scenarios? Do they affect the extent to which subjects are willing to share some responsibility for the overall action (cf. Moretto et al., 2011 and Frith, 2014 on connections between the experience of agency and the sense of responsibility), and the extent do which they actually should be held co-responsible?

Such connections between the phenomenal and normative aspects of joint action have so far received little attention in the literature, despite a sustained interest in the normativity of joint action that is most notably linked to the work of Margaret Gilbert. Gilbert has argued that joint action has an important normative dimension: it is structured by obligations that become especially visible when participants just drop out of the cooperation, something they can appropriately be rebuked for by the other(s) (e.g. Gilbert, 1990). To account for the origin of such obligations, Gilbert points to the role of joint commitment in joint action. Other authors have more recently connected this topic to issues of phenomenology by analyzing the sense of commitment as element in the phenomenology of action (e.g. Michael, 2021), and by discussing the way commitments shape the phenomenology of joint action (Fernández-Castro & Pacherie, 2022).

This strand in the debate on the phenomenology of joint action is taken further in this special issue by Matthew Chennells and John Michael. In "Breaking the Right Way: A Closer Look at How We Dissolve Commitments", they ask how our experience of commitments informs decisions about whether we can dissolve joint commitments that we no longer wish to uphold. Building on Michael, Sebanz & Knoblich (2016), the authors propose a framework centered around the notion of a "sense of commitment"—an aspect of experience which captures an agent's being motivated by a belief that a co-agent expects them to perform an action and may be relying on this expectation. To apply this framework to the case of commitment dissolution, the authors adopt a virtual bargaining approach. This psychological model of rational choice holds that agents in conditions that do not allow them to communicate should opt for the solution that they would select in an open bargaining process, and hence use simulations of bargaining in such situations. On the resulting view, we assess whether we can and should opt out of existing commitments to joint action by imagining a conversation with our partner(s) in which we request a dissolution of the commitment. In doing so, we use our sense of commitment to assess our degree of motivation, which on the authors' sense of commitment-framework corresponds to the expectations and reliance on others.

Normativity in joint action as seen through the lens of the phenomenology of joint action is also addressed in this special issue by returning to classical phenomenological works. Jennifer Mei Sze Ang's paper "Sartre on the Responsibility of the Individual in Violent Groups" draws on classical phenomenology in order to illuminate aspects of the phenomenology of joint action in debates about normative aspects of joint actions. Through discussions of Sartre's views on encounters with others in *Being and Nothingness* and *Notebooks for an Ethics*, his account of antisemitism in *Anti-Semite and the Jew* and of his theory of ensembles in *Critique of Dialectical Reason*, Ang reconstructs Sartre's views about the responsibility of individuals who participate in violent groups. Against theorists like Arendt, Milgram and Allport who see such evil-doers as socially conforming individuals who abdicate all responsibility by blindly following given social structures, Ang presents Sartre's position as one that recognizes the essential social embeddedness of human existence while nevertheless maintaining a demanding notion of individual responsibility. At the same time, Sartre's theory of bad faith allows him to explain how agents of group violence—such as the Nazis—despite acting on their own decisions deceive themselves by denying their responsibility for the mass violence they perpetrated. As Ang argues, Sartre's defense of individual freedom and responsibility has the consequence that integrated groups are in a constant risk of dissolving themselves, for individuals can always opt out of the cooperation. Therefore, Sartre's theory of different kinds of groups in *Critique of Dialectical Reason* includes an account of devices by which groups can regulate and maintain cooperation, an account that, Ang argues, is missing from more recent theories of joint action like Bratman's and Gilbert's. Such devices can include assignment of specific roles and pledges or oaths, but also a shared fear of group-disintegration, a constant threat of in-group violence and a strong leader. Elements like these affect the phenomenology of joint action in violent groups and can have the effect that agents "perceive a lack of control on their part over the group's actions", but as Ang argues, Sartre's theory allows to take this into account without reducing or denying the responsibility of individual agents.

Moreover, as Salmela & Nagatsu (2017) point out, affective phenomenology has been somewhat neglected in the discussions of phenomenology of joint actions; Ang's paper centrally places emotional complexities within the phenomenology and normativity of joint actions. In the context of affective phenomenology of joint actions, the reader may also wish to compare Ang's discussions with those presented by Forlè. But while Salmela & Nagatsu attend to *positive* affects in connection with joint action—their short answer to the question: "How does it feel to act together?" is: "Simply put, it feels good" (Salmela & Nagatsu, 2017, 466)—Ang foregrounds difficult and negative affective components, such as hostility, hatred and shame. Likewise, her focus on violence—and similarly, Chennells and Michael's focus on commitment dissolution—can serve as corrective to a tendency in the literature to recognize the role of competition, conflict and breakdown in joint actions merely in the abstract (Searle, 1990; Bratman, 2014), and center actual analyses on cases where agents more or less harmonically cooperate in order to achieve common everyday goals. Future research could follow their footsteps and pay more attention to how the phenomenology of joint action is shaped by, and can favour or enable, aspects like conflict, pressure, dissolution and breakdown in joint action. Finally, in this context, one may also consider extending the discussion to certain central forms of joint action prevalent in our modern societies but which have not yet been given center stage in the literature. For example, take social media and the propagation of hate or the erosion of democratic values and spread of anti-scientific conspiracy theories. Here the scenarios may be further complicated by the fact that technology can offer a certain anonymity that may affect an agent's sense of agency while at the same time it is a powerful tool that can get out of control very quickly, e.g. viral content. In these contexts, discussions of responsibility and normativity must take into account phenomenal components of joint actions, or group actions for that matter, such as positive feelings of strong inclusion and impactful agency as well as negative feelings of pressure, conflict and loss of control.

2 Underlying mechanisms

Next to debates about the phenomenological fine-structure of joint action, a further important strand of existing research about the phenomenology of joint action concerns the mechanisms that underlie the sense of agency for joint actions. Pacherie (2012, 2014), Dewey et al. (2014) and Tollefsen (2014) have proposed to extend established accounts of the mechanisms responsible for the sense of agency in individual action to the case of joint action. On such accounts, mechanisms for action control predict movements and reafferences on the basis of intentions and efference copies of motor commands. Comparators are used to check if these elements match each other. In the case of a match, the subject feels that she is performing the action (more precisely, she feels a sense of initiation, sense of intentional causation, and a sense of being in control: Pacherie, 2008); in the case of mismatch, adjustments are made, and the subject may feel absent, reduced or modulated sense of agency (such as a sense of having to exercise control: Pacherie, 2008). Bayesian modeling allows us to understand how agency cues from different modalities get integrated into an ongoing assessment of agency (Moore & Fletcher, 2012; Synofzik et al., 2013). The main challenge in extending such accounts to the case of joint action lies in the added complexity that the cooperation with other agents entails: in addition to monitoring the agent's own actions, the system also needs to assess to what extent given events are brought about by other participating agents, and how the various actions can be coordinated such as to achieve the desired joint outcome. At a conceptual level, these challenges have been analyzed by Pacherie (2012, 2014) and Tollefsen (2014). But to gain a more detailed understanding of the mechanisms that enable monitoring and control for joint actions, computational models are needed.

The article “Game Theory and Partner Representation in Joint Action: Toward a Computational Theory of Joint Agency” by Cecilia De Vicariis, Vinil T. Chackochan and Vittorio Sanguineti adds to this emerging field of research by developing and simulating a computational theory of joint action. Building on the MOSAIC (MOdular Selection And Identification for Control) model for individual action formulated by Wolpert and Kawato (1998), the authors introduce an architecture that combines Bayesian optimal control with a game-theoretic account of coordination between agents. In order to enable the model to capture physical interaction between agents (where self- and other-states cannot be estimated independently from each other), the authors postulate two different modules that run simultaneously. One interprets the state of the body and the environment based on the hypothesis that the agent is alone in acting, the other works on the hypothesis that one or more partners contribute to the action. An Agency Judgment block then combines the likelihoods calculated by these two state observers with the available priors to assess which of the two hypotheses has highest posterior probability, and to gate correspondingly the motor commands issued by the self- vs. the other-module. The resulting posterior probabilities for the two hypotheses are identified by the model with a sense of self-agency and a sense of joint-agency, respectively. In order to test the internal coherence and completeness of the model and to explore model predictions for the sense of self-agency and of joint-agency, the authors developed a simulation of the model using an experimental paradigm in which two agents perform mechanically coupled arm movements, including three settings that differ in the modality of the available information about partner movements (only haptic; haptic plus visual information on a screen; full visibility ofpartner).

Besides improving our understanding of the mechanisms that may underlie the phenomenology of joint action, the authors’ model and simulation also bear in several ways on research regarding the phenomenological fine-structure of joint action (see Section 1 above). Thus, the authors’ model predicts that the scope and reliability of the available information about partners affect the sense of agency for joint action: more detailed and reliable information (such as visual as opposed to haptic information) makes the partners’ actions more predictable. As a consequence, the likelihood of the joint-action-hypothesis—and correspondingly also the sense of joint-agency—is increased, while that of the self-action-hypothesis—and correspondingly also the sense of self-agency—is reduced. Future research could test this implication experimentally, and further explore the role that perception (in different modalities) and communication play for the phenomenology of joint action. Furthermore, by treating the sense of joint-action and the sense of self-action as phenomenal indications of posterior probabilities for different hypotheses (self-action vs. joint action), the authors are able to capture Pacherie’s (2012) distinction between experiences of we-agency (strong sense of agency for joint action at the expense of sense of self-action) and experiences of shared agency (strong sense of agency for joint action together with strong sense of agency for self-action) without having to assume qualitatively different forms of the sense of agency for joint actions.

Finally, a further fruitful aspect of the authors' model consists in its implications regarding the *functional* role of the phenomenology of joint action: depending on what hypothesis (self-action vs. joint action) the Agency Judgment subsystem favours, different further actions are selected (De Vicariis et al., this volume, section 2.2.3). The issues of how (various aspects of) the phenomenology of joint action affect how the action unfolds, and more generally, what functions that phenomenology (with its various components) can play, are yet further topics that deserve attention in future research. These discussions are critical not only for a better understanding of the role of experience in controlling and executing multiagent actions but also in understanding and structuring the debates around the normativity of joint actions. For example, Pacherie (2014) defends a separation of mechanisms for executive tasks from mechanisms for control and monitoring tasks, and claims that especially in large groups the two types of tasks may not be equally distributed. In fact, they can completely come apart. Her example is that of the conductor of an orchestra who has no executive tasks whatsoever but is fully in-charge of monitoring and controlling the orchestra. In Pacherie's model he should also have the strongest sense of joint agency since he is best able to predict and control the actions of the others in the group. How does such a mapping of underlying mechanisms to the phenomenology of joint action explain what is going on, for example, in violent groups? Furthermore, if one refocuses the discussion on affective phenomenology in joint actions as recommended by Salmela & Nagatsu (2017)—the reader may compare also Ang's and Forlè's contributions on this—it becomes natural to question a strict distinction between cognitive and emotional mechanisms in joint action.

3 Phenomenal preconditions for joint action

In his seminal 1990 article on "Collective Intentions and Actions", John Searle argues that the possibility of shared intentions and joint actions presupposes an understanding of other human beings as candidates for cooperation (Searle, 1990, 414 f.). Normally, this awareness consists not in explicit beliefs, argues Searle, but in a "communal awareness" (414), a basic "sense of us" (414) that permeates our everyday experience of our social environment.

If Searle is right, there are not only phenomenal *characteristics* of joint actions, there are also phenomenal *preconditions* for joint actions—social structures in our everyday experience that enable and support joint action. In this special issue, this topic is addressed in the contributions by Moran, Vincini and Seemann. In "The Phenomenology of Joint Agency: The Implicit Structures of the Shared Life-World", Dermot Moran draws, like Ang, on classical phenomenological literature and provides a survey of contributions in the phenomenological tradition that have explored, long before Searle, such preconditions. He argues that the notions of a shared life-world (Husserl) or "Mitsein" (Heidegger, Schutz) in the phenomenological tradition are immediately relevant to debates about joint action: these notions identify a shared horizon for joint actions which make available social roles and patterns of action that we constantly draw on in joint actions. Using Berger and Luckmann's 1967 work *The Social Construction of Reality*, Moran shows how the phenomenological tradition also addressed the developmental aspect of this topic: as he points out, Berger and Luckmann locate the emergence of both a sense of the self and a sense of external reality in primary socialization, as parts of a process in which a sense of "we" connecting children with "significant others" takes precedence. Finally, Moran discusses Sartre's *Critique of Dialectical Reason* in order to argue that the phenomenological tradition also provides elaborate accounts of joint action, including theoretical distinctions between various levels of group-integration that are absent from the current debate. Through these and other examples, Moran shows how the phenomenological tradition provides a great wealth of theoretical resources which could serve to enrich and transform current debates on joint action. The reader may wish to compare here Ang's article, which, too, draws on the *Critique of Dialectical Reason* and makes Sartre's discussion of group agency fruitful for analyzing the concrete case of violent groups.

In "Pairing and Sharing: The Birth of the Sense of Us", Stefano Vincini, too, draws on the phenomenological tradition. He does so in order to explore a specific precondition for joint action: namely, emotion sharing, which, on his proposal, is the developmental origin of the "sense of us" postulated by Searle. Vincini defends the so-called "straightforward view" of emotion sharing, which was originally proposed in classical phenomenology by Max Scheler and Edith Stein. On this view, participants in emotion sharing undergo a numerically identical token emotion, which they experience as "ours". This shared experience is the result of individuation processes which are based on association by similarity—drawing on a shared intentional object and similar emotional expressions, evaluations and feelings. But how can such emotion sharing be at the origin of the "sense of us" if babies experience themselves and caregivers in quite dissimilar ways—themselves mainly proprioceptively, caregivers visually—such that the similarities that underlie the synthesis of shared emotions are not manifest to them? In response, Vincini introduces a "pairing" view of infant emotion perception: in this view, babies learn to perceive the emotions of others thanks to similarities in expressive behaviour that exist due to parental mirroring, and that babies can perceive despite the differences in their self- and other-perception, e.g. similar vocalizations and interacting gestures. When such similarities occur, sensorimotor schemas that the baby had formed through first-person-singular experience get activated and enable perception of the caregiver's behaviour as expressive of a corresponding experience. Thus, the pairing view of infant emotion perception and the straightforward view of emotion sharing strengthen each other: the same similarities that make possible emotion perception according to the former view also enable emotional sharing according to the latter view. Vincini also indicates how the resulting position can be empirically tested, as it predicts that abilities like gaze following and basic social perception of the caregiver's "positive intentions and emotions" precede gaze perception in development. In particular, he proposes a study of the developmental relation between shared attention and gaze perception using Brooks and Meltzoff's (2005) measure of gaze perception as a way in which future research could empirically assess the view presented in his article.

To be able to engage in joint action, we need not only be aware of others as candidates for cooperation, we also need to experience the objects around us as public objects that can be perceived and acted upon not only by ourselves, but also by others. As Axel Seemann points out in "The Public Character of Visual Objects: Shape Perception, Joint Attention, and Standpoint Transcendence", ordinary perceptual experience enables us to know that its objects are public in this sense, but how this is so stands in need of an explanation. Seemann argues that existing action-based theories of perception do not provide a satisfactory account in this regard. Instead, he proposes an explanation that appeals to the experience of joint attention. Joint attention, he argues, uses a spatial framework ("social space") that presents the locations of the other participants as "origins of perception and action". This spatial framework is necessary for us to be able to locate the object of joint attention relatively to the position of the other participant(s). At the same time, the ability to experience space in this way also forms the basis for our perception of objects as public: Seemann argues that in ordinary perception, we use a related spatial framework ("public space") that represents *all* spatial locations as "standpoints that, were they occupied by co-perceivers, would result in joint attention to the target". Ordinary perception thus presents objects as located in a space in which they can simultaneously also be perceived from other positions than our own, i.e., it presents them as public. While Seemann offers a structural rather than developmental analysis of the relevant aspects of experience, future discussion could address the question to what extent his views about the preconditions for our ability to perceive objects as public can be connected to research in developmental psychology.

4 Conclusion

Joint actions articulate our lives as social creatures, and the ways in which we experience such actions permeate our lives as conscious creatures. It is therefore not surprising that the phenomenology of joint action is a rich area of inquiry that profits from contributions from various disciplines and intellectual traditions. We strongly believe the articles here collected will stimulate further debate and research in this emergent interdisciplinary field. Last but not least, we would like to thank all authors of the contributions to this special issue for taking part in this joint action. Its phenomenology has been, to us guest editors at any rate, truly pleasant and enriching.

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References

Balconi, M. (Ed.). (2010). *Neuropsychology of the sense of agency: From consciousness to action*. Springer.

Bayne, T. (2008). The phenomenology of agency. *Philosophy Compass*, *3*, 182–202.

Berger, P. L., & Luckmann, T. (1967). *The social construction of reality. A treatise on the sociology of knowledge* [first published 1966]. Anchor Books.

Bolt, N. K., & Loehr, J. D. (2017). The predictability of a partner's actions modulates the sense of joint agency. *Cognition*, *161*, 60–65.

Bolt, N. K., Poncelet, E. M., Schultz, B. G., & Loehr, J. D. (2016). Mutual coordination strengthens the sense of joint agency in cooperative joint action. *Consciousness and Cognition*, *46*, 173–187.

Bratman, M. (1992). Shared cooperative activity. *The Philosophical Review*, *101*, 327–341.

Bratman, M. (1993). Shared intention. *Ethics*, *104*, 97–113.

Bratman, M. (1999). *Faces of intention. Selected essays on intention and agency*. Cambridge University Press.

Bratman, M. (2014). *Shared agency*. Oxford University Press.

Braun, N., Debener, S., Spychala, N., Bongartz, E., Sörös, P., Müller, H. H. O., & Philipsen, A. (2018). The senses of agency and ownership: A review. *Frontiers in Psychology*, *9*, 535.

Brewer, T. (2009). *The retrieval of ethics*. Oxford University Press.

Brooks, R., & Meltzoff, A. N. (2005) The development of gaze following and its relation to language. *Developmental Science*, *8*(6), 535–543.

Capozzi, F., Becchio, C., Garbarini, F., Savazzi, S., & Pia, L. (2016). Temporal perception in joint action: This is MY action. *Consciousness and Cognition*, *40*, 26–33.

Carpenter, M. (2009). Just how joint is joint action in infancy? *Topics in Cognitive Science*, *1*, 380–392.

Chaminade, T., Marchant, J., Kilner, J., & Frith, C. (2012). An fMRI study of joint action–varying levels of cooperation correlates with activity in control networks. *Frontiers in Human Neuroscience*, *6*, 179.

Chennells, M., & Michael, J. (2018). Effort and performance in a cooperative activity are boosted by perception of a partner's effort. *Scientific Reports*, *8*, 15692.

de Vignemont, F., & Fourneret, J. (2004). The sense of agency: A philosophical and empirical review of the 'Who' system. *Consciousness and Cognition*, *13*, 1–19.

Dewey, J., Pacherie, E., & Knoblich, G. (2014). The phenomenology of controlling a moving object with another person. *Cognition*, *132*(3), 383–397.

Dokic, J. (2010). Affordances and the sense of joint agency. In Balconi (2010), 23–43.

Fernández-Castro, V., & Pacherie, E. (2022). *Commitments and the sense of joint agency* (pp. 1–18). Early View: Mind & Language.

Frith, C. (2014). Action, agency and responsibility. *Neuropsychologia*, *55*, 137–142.

Frith, C., Blakemore, S., & Wolpert, D. M. (2000). Explaining the symptoms of schizophrenia: Abnormalities in the awareness of action. *Brain Research Review*, *31*, 357–363.

Gallagher, S. (2000). Philosophical conceptions of the self: Implications for Cognitive Science. *Trends in Cognitive Science*, *4*(1), 14–21.

Gallagher, S. (2012). Multiple aspects in the sense of agency. *New Ideas in Psychology*, *30*(1), 15–31.

Gangopadhyay, N., & Pichler, A. (2021). Texts: A case study of joint action. *Sats: Northern European Journal of Philosophy*, *22*(2), 169–190.

Gilbert, M. (1990). Walking together: A paradigmatic social phenomenon. *Midwest Studies In Philosophy*, *15*, 1–14.

Giubilini, A., & Levy, N. (2018). What in the world is collective responsibility? *Dialectica*, *72*, 191–217.

Haggard, P., & Eitam, B. (2015). *The sense of agency*. Oxford University Press.

Isaacs, T. (2011). *Moral responsibility in collective contexts*. Oxford University Press.

Kutz, C. (2000). Acting together. *Philosophy and Phenomenological Research*, *61*, 1–31.

Le Bars, S., Devaux, A., Nevidal, T., Chambon, V., & Pacherie, E. (2020). Agents' pivotality and reward fairness modulate sense of agency in cooperative joint action. *Cognition*, *195*, 104117.

Le Bars, S., Bourgeois-Gironde, S., Wyart, V., Dilan-Sari, I., Pacherie, E., & Chambon, V. (2022). Interplay of motor coordination and strategic reasoning on explicit and implicit sense of agency in joint action. *Psychological Science*, *33*, 736–751.

León, F. (2020). For-me-ness, for-us-ness, and the we-relationship. *Topoi*, *39*, 547–558.

León, F., Szanto, T., & Zahavi, D. (2019). Emotional sharing and the extended mind. *Synthese*, *196*, 4847–4867.

McNeill, W. (1995). *Keeping together in Time: Dance and Drill in Human History*. Harvard University Press.

Meyer, M., van der Wel, R. P., & Hunnius, S. (2016). Planning my actions to accommodate yours: Joint action development during early childhood. *Philosophical transactions of the Royal Society of London Series B Biological sciences*, *371*, 20150371.

Michael, J. (2021). *The philosophy and psychology of commitment*. Routledge.

Michael, J., Sebanz, N., & Knoblich, G. (2016). The sense of commitment: A minimal approach. *Frontiers in Psychology*, *6*, 1968.

Miller, S. (2001). *Collective Responsibility Public Affairs Quarterly*, 15(1), 65–82.

Moore, J. W., & Fletcher, P. C. (2012). Sense of agency in health and disease: A review of cue integration approaches. *Consciousness and Cognition*, *21*(1), 59–68.

Moretto, G., Walsh, E., & Haggard, P. (2011). Experience of agency and sense of responsibility. *Consciousness and Cognition*, *20*, 1847–1854.

Obhi, S., & Hall, P. (2011). Sense of agency in joint action: Influence of human and computer co-actors. *Experimental Brain Research*, *211*, 663–670.

Pacherie, E. (2008). The phenomenology of action: A conceptual framework. *Cognition*, *107*, 179–217.

Pacherie, E. (2012). The phenomenology of joint action: Self-agency vs. joint-agency. In A. Seemann (Ed.), *Joint attention: New developments* (pp. 323–389). MIT Press.

Pacherie, E. (2014). How does it feel to act together? *Phenomenology and the Cognitive Sciences*, *13*, 25–46.

Pettit, P. (2003). Groups with minds of their own. In A. I. Goldman, & D. Whitcomb (Eds.), *Social Epistemology: Essential readings* (pp. 167–193). Oxford University Press.

Pettit, P., & Schweikard, D. (2006). Joint actions and group agents. *Philosophy of the Social Sciences*, *36*(1), 18–39.

Reddy, V. (2008). *How infants know minds*. Harvard University Press.

Richardson, M., Schmidt, R., Dale, R., Kallen, R., & Raczaszek-Leonardi, J. (Eds.). (2018). *Dynamics of joint-action, social coordination and multi-agent activity*. Frontiers Media.

Rochat, P. (2001). *The infant's world*. Harvard University Press.

Sahaï, A., Desantis, A., Grynszpan, O., Pacherie, E., & Berberian, B. (2019). Action co-representation and the sense of agency during a joint Simon task: Comparing human and machine co-agents. *Consciousness and cognition*, *67*, 44–55.

Salmela, M., & Nagatsu, M. (2017). How does it really feel to act together? Shared emotions and the phenomenology of we-agency. *Phenomenology and the Cognitive Sciences*, *16*(3), 449–470.

Searle, J. (1990). Collective intentions and actions. In P. Cohen, J. Morgan, & M. Pollack (Eds.), *Intentions in communication* (pp. 401–415). MIT Press.

Sebanz, N., & Knoblich, G. (2009). Prediction in joint action: What, when, and where. *Topics in Cognitive Science*, *1*, 353–367.

Seemann, A. (2009). Joint agency: Intersubjectivity, sense of control, and the feeling of trust. *Inquiry: A Journal Of Medical Care Organization, Provision And Financing*, *52*, 500–515.

Synofzik, M., Vosgerau, G., & Voss, M. (2013). The experience of agency: An interplay between prediction and postdiction. *Frontiers in psychology*, *4*, 127.

Tollefsen, D. (2014). A dynamic theory of shared intention and the phenomenology of joint action. In S. R. Chant, F. Hindriks, & G. Preyer (Eds.), *From individual to collective intentionality. New essays* (pp. 13–33). Oxford University Press.

Trevarthen, C. (1980). The foundations of intersubjectivity: Development of interpersonal and cooperative understanding in infants. In D. Olson (Ed.), *The social foundations of language and thought* (pp. 316–342). W.W. Norton.

Tuomela, R. (2006). Joint intention, we-mode and I-mode. *Midwest Studies in Philosophy*, *30*, 35–58.

Wilson, J. (2015). Metaphysical Emergence: Weak and Strong. In T. Bigaj, C. Wuthrich (Eds.), *Metaphysics in Contemporary Physics. Poznan Studies in the Philosophy of the Sciences and Humanities* (pp. 251–306). Brill.

Wolpert, D. M., & Kawato, M. (1998). Multiple paired forward and inverse models for motor control. *Neural Networks*, *11*(7–8), 1317–1329.

Zahavi, D. (2015). You, me and we—the sharing of emotional experiences. *Journal of Consciousness Studies*, *22*, 84–101.

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